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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003904342 for a patent by ANGUS REARDON as filed on 15 August 2003.

WITNESS my hand this
Twenty-fifth day of August 2004

LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT AND SALES

P/00/009
Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: "BAILING APPARATUS "

The invention is described in the following statement:

TITLE

BAILING APPARATUS

FIELD OF INVENTION

This invention is concerned with removing liquid, such as water, from bodies of water such as, pools, ponds, water holes, creeks, rivers, excavated holes, flooded areas, natural or artificial reservoirs and boats. In particular, but not exclusively, the invention relates to a portable bailing apparatus that can remove the last remaining litres of water from water holes, reservoirs, pools and flooded areas of minimum depth and with variable bed characteristics. This invention may also apply to removal of other liquids, such as oil or chemicals.

BACKGROUND OF THE INVENTION

Droughts have a major impact on a nation's economy. Of all the climatic phenomena to afflict Australia, drought is probably the most economically costly, the economic problems predominantly resulting from crop failure and livestock loss. Droughts can extend over several years, relieved by only brief transitory rains. Drought relief for farmers and agricultural communities is restricted to times of exceptional circumstances and economic relief only is available for droughts of atypical length or severity. In third world countries, such as Ethiopia, Botswana and Mozambique, drought repeatedly and ultimately results in malnutrition, famine and prevents economic development.

Water is the most vital resource during drought. In drought conditions,

removing water from water holes or digging new water holes or deepening existing springs can sometimes provide an adequate supply of water for livestock or crops. However, extraction of usable water from shallow bodies of water such as waterholes, creeks, reservoirs, springs, wells and pools is very difficult. Most pump devices leave approximately a foot of valuable water behind and generally this water is muddy or silty and often inaccessible from dry or solid land. At present the only way of accessing this water is by wading out through the mud or silt to the shallow pools of water and bailing out the water using a container such as a bucket. This is a very inefficient, inconvenient and unsafe method. Therefore in remote areas or in less developed sections of the world there is a need for a manual, portable and maneuverable bailing apparatus that can extract the last litres of water from a body of water, does not require connection to a mains power source and can be operated by one person.

The prior art focuses on water pumps designed for fire-fighting (US Patent Nos. 4,553,902 and 5,419,497), swimming pools (US Patent No. 5,655,246) or removing oil from bodies of water (GB Patent No. 2,269,329). The prior art pump apparatus are generally sophisticated devices comprising a support stand, motor-driven pump, float, water conduits and supporting members. These apparatus require a power supply, are expensive to manufacture, not easily carried to remote areas and not suitable for extracting water from shallow, muddy or silty bodies of water.

GB Patent Number 1,020,712 in the name of John McColl describes a

suction pump strainer for the drainage of shallow pools of water, in particular for the removal of nuisance water in collieries and civil engineering projects. It comprises a cylindrical casing, having a tubular member with an elliptical inlet opening and a strainer. The elliptical inlet opening is located in a base wall of the casing. The casing is also provided with perforations in a side wall to function as a strainer or filter. The tubular member is inclined at an acute angle relative to the base wall of the casing and has a water inlet for connection to a pump conduit. The disadvantage of this apparatus is that it is not designed for muddy or silty water bodies which can also be infested with weeds. The casing would sink into a muddy water bed making it very difficult to maneuver and therefore limiting its usefulness because the base wall is flat and makes contact with the bottom of the water body. It is important that a bailing apparatus can be easily transported across a water body containing very little water to areas containing valuable water pools. Water beds are generally uneven, rocky, muddy or silty and it is important to prevent as far as possible the bailing apparatus becoming trapped in the bottom of the water body. Also, when pumping water for livestock in hot climates it is important to draw cool water from the very bottom of the water body.

US Patent Number 5,669,323 in the name of Aaron Pritchard describes an automatic battery-operated bailer that can remove water from floor of boats, such as canoes. The bailer comprises a pump, flexible hose, water conduit means and battery box, and the battery box is secured to the

interior of the boat. This bailer is designed specifically for boats and would not be suitable for use in muddy or silty waterholes because the pump means would sink into the bed of the waterhole.

Hence, there is a need for a water extraction aparatus that addresses or at least ameliorates the problems encountered with the prior art and which is efficient and economic in use.

SUMMARY OF INVENTION

In one form, although it need not be the only or indeed the broadest form, the invention resides in a bailing apparatus designed for removing water from shallow bodies of water, said apparatus comprising a hollow body which has an arcuate bottom surface which in use retains a pump inlet within an interior of the hollow body, and one or more openings located in a wall of the hollow body.

The hollow body may have any suitable shape but is preferably spheroidal. More preferably it is ovoidal, and most preferably of a shallow ovoid shape as hereinafter described in the illustrated embodiment.

The hollow body may have a plurality of spaced openings to facilitate water ingress, which may be arranged in a row about the mid section or mid part of the ovoidal body which has the greatest diameter. More preferably however there is provided a single elongate opening in the ovoidal body about its central diameter.

Preferably, the hollow body is comprised of two or more components which may be releasably attached to each other and there may be provided

releasable attachment means to facilitate this. More preferably, the hollow body is comprised of two half or semi-components which are identical and attached to each other about the mid section or area or area of greatest diameter as shown hereinafter in the illustrated embodiment.

Any appropriate releasable attachment means may be used for this purpose such as bolts or elongate fasteners extending between appropriate sockets located on each component.

It is preferred that the hollow body comprises two components that are releasably attached to each other as described above because of the necessity of placing the pump inlet and associated conduit within the interior of the hollow body as shown hereinafter in the illustrated embodiment.

Throughout this specification, "comprise", "comprises" and "comprising" are used inclusively rather than exclusively, will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference may now be made to a preferred bailing apparatus of the invention as shown in the attached drawings wherein:

FIG. 1 is a side view of the bailing apparatus of the invention in use.

FIG. 2 is a more detailed side view of the bailing apparatus shown in FIG. 1.

FIG. 3 is an end view of the bailing apparatus shown in FIG. 1.

FIG. 4 is a plan view of one of the identical sections of the hollow

body.

DETAILED DESCRIPTION OF INVENTION

For the purposes of this invention, by "waterhole" is meant any body of water, such as creeks, springs, rivers, reservoirs, ponds, pools, wells, excavated holes and flooded areas.

FIG. 1 shows a bailing apparatus 10 of the present invention in use in a waterhole 5. Body 16 of bailing apparatus 10 is resting on waterbed 8 above mud or silt 7 below water 6. Suction pump 12 of bailing apparatus 10 is placed on dry land 9 and is attached to body 16 by suction conduit or hose 13. Conduit 13 is pivotally attached to valve casing 15 (see FIG. 2). Valve casing 15 is located in a hollow interior 22 of body 16 and is completely surrounded by body 16. Conduit 13 enters body 16 through conduit aperture 27 (see FIG. 3).

Body 16 is releasably-attached to pole 4 by rope 21. Rope 21 attaches to container 16 through an attachment means 20, such as a hook or collar.

Body 16 has a shallow ovoidal shape and may comprise two identical sections 17 and 18. Sections 17 and 18 are releasably fastened together (see FIG. 4). Valve casing 15 and conduit 13 are placed in the hollow interior 22 of body section 18. Section 17 is subsequently fastened to section 18. There is also shown gap 19 between sections 17 and 18. Gap 19 allows entry of water or liquid into hollow interior 22 of body 16. Valve casing 15 is securely held in place within body 16 when sections 17 and 18

are fastened together.

FIG. 2 is a more detailed side view of body 16 showing the valve casing 15 of bailing apparatus 10 inside body 16. Body 16 is resting on the bottom of waterhole 8. Valve casing 15 comprises check valve 26 which has a strainer or gauze (not shown). Conduit 13 is pivotally attached to valve casing 15 through attachment means 14, such as a bush or other form of pivot joint. Gap 19 extends along the length of body 16 in between body sections 17 and 18.

FIG. 3 is an end view of body 16 showing conduit aperture 27 and container fastening sleeves 28 and 29.

FIG. 4 is a plan view of section 17 of body 16 showing fastening sleeves 28 and 29, rope attachment means 20 and conduit aperture 27. Sleeve components 28 and 29 are rigidly attached to body 16, such as by welding. Sleeves 28 and 29 of section 17 mate with fastening sleeves 29 and 28 respectively of section 18. The fastening sleeves are held in place by bolts 30. It is important to note that section 18 will have an inverse orientation to that shown for section 17 in FIG. 4, so that sleeve 28 of section 18 will locate between sleeves 29 of section 17, and sleeves 29 of section 18 will locate at each end of sleeve 28 of section 17 before insertion of bolts 30.

The operation of bailing apparatus 10 will now be described. Before use of bailing apparatus 10, valve casing 15 and conduit 13 are placed in hollow interior 22 of body 16. Body sections 17 and 18 are fastened together and secured as described above in FIG. 4. Container parts 17 and 18 can

be releasably attached by any other releasable attachment if desired, such as by interference or use of a clamping device. Gap 19 is maintained by the attachment means.

Conduit 13 is attached to suction pump 12. Body 16 can be attached to pole 4 via rope 21. This attachment facilitates maneuverability and guidance of bailing apparatus 10 when in a waterhole but need not necessarily be attached because maneuverability of hollow body 16 may be achieved by pushing or pulling conduit 13. This is important in areas where there are obstacles in the waterhole, such as rocks or logs.

In practice the person operating the bailing apparatus may have to be some distance away from the water because of a muddy bank or quick sand. Body 16 of bailing apparatus 10 can be dragged or pushed into a waterhole or thrown into a waterhole. The ovoidal shape of body 16 means that the bailing apparatus can be used at any orientation, i.e, it does not matter if body section 17 or 18 is in contact with the waterhole bed. The ovoidal shape of body 16 also insures that body 16 can be easily maneuvered over the waterhole bed and does not sink into muddy or silty beds. Furthermore, body 16 can enter the water at any angle because the ovoidal shape of the apparatus will automatically orientate itself as it sinks to rest flat on the bottom of the waterhole.

Suction pump 12 and collection container (not shown) remain on dry land or other pontoon or raft structure. Water is discharged into the collection container through a discharge conduit (not shown). When

assembled body 16 is placed in water in a waterhole, the person operating bailing apparatus 10 activates suction pump 12. This creates a vacuum in conduit 13 which opens check valve 26 allowing water to enter conduit 13 through the valve orifice. The water is sucked through conduit 13, pumped into the discharge conduit and discharged into a collection container. Suction pump 12 can be any type of pump such as a vacuum pump, hydraulic or rotary pump. Valve 26 can be any type of check valve, such as a ball, spring, or swing and lift valve. Alternatively, the valve inlet may comprise a venturi device. Conduit 13 can have variable length and width and is preferably made out of any flexible and waterproof material such as plastic, for example, polypropylene.

Valve casing 15 may comprise a strainer or gauze (not shown) encasing check valve 26 to prevent particles such as stones and weeds entering conduit 13.

When body 16 is placed in water, water enters hollow interior 22 of body 16 through gap 19. Gap 19 may comprise a series of spaced openings depending on the specific application. Preferably, gap 19 is an elongate single opening arranged in a row about the mid section or mid part of the ovoidal body which has the greatest diameter.

Preferably, there is a relationship between the size of body 16 (and therefore the size of gap 19) and the capacity of the suction pump or design of check valve 26. It is not desirable for the capacity of the pump to be too high for the size of the body. If the capacity is too high, air and debris or

particles will also be sucked into conduit 13 through the valve orifice.

Preferably, the radius of body 16 is 0.5-0.85 m, more preferably 0.75 m.

Preferably, gap 19 is continuous along the centre circumference of container 16 and has a width of 5-20 mm. More preferably, the width is 10 mm.

Preferably suction conduit 13 has a diameter of 3-8 cm, more preferably 5-6 cm.

Body 16 can be made out of any suitable material, such as stainless steel, galvanised iron or copper plate, as long as the material selected is waterproof, and sufficiently heavy so that body 16 sinks to the bottom of any body of water or liquid. It is important that body 16 does not float on the surface of the water. It will also be appreciated that body 16 can be made of non metal if used in corrosive environments. Preferably, the weight of body 16 is 6-12 kg.

The shallow ovoidal shape of body 16 aids movement of body 16 across a waterhole bed and prevents sinking of the container into sticky mud or silt, or tipping over of the apparatus. Preferably, the interior volume of body 16 is 1-3 m^3, more preferably, 1.75 m^3. However, it will be appreciated that the interior volume of body 16 is widely variable depending on the application. For example, the volume will be much less if the apparatus was used for draining a fish tank.

It will be appreciated that the present invention is not limited to the

extraction of water. The invention can also be used to remove any type of liquid, such as oil or chemicals, from a body of liquid. Thus, for example, oil may be removed from water, or vice versa, or the bailing apparatus of the invention may be used for cleaning up spills of hazardous chemicals. The ratio of the size of body 16, width of gap 19 and capacity of suction pump 11 has to be adjusted when applying the invention to more viscous liquids.

The volume of body 16 is preferably 70-85% larger than the volume displacement of valve casing 15. This is required to reduce the velocity of the fluid entering body interior 22 through gap 19. Gap 19 is preferably 70-85% greater than the total gap or available external opening(s) of valve casing 15. There is also a preferred ratio of the capacity of the pump, area of the external opening(s) of valve casing 15 and width of gap 19, to prevent unwanted suction of air or contaminants into conduit 13. This avoids creation of turbulence.

The invention as shown in the preferred embodiment has the following advantages and uses:

1. the invention can be used to extract the last few litres of water from any waterhole;
2. the invention can be used in muddy or silty water bodies which can also be infested with weeds, sludge or any problem material;
3. the invention is cheap to manufacture and the body can be attached to any suction pump to enable extraction of any liquid from shallow pools or any type of waterhole;

4. the invention has a wide range of uses and can be used for removing liquid from flooded areas such as homes, boats, mines, collieries and civil engineering and building sites;
5. the invention is simple to use and can be operated by one person;
6. the invention is portable, does not require connection to mains electricity and can be transported to remote areas;
7. the invention offers greater safety to operators; and
8. the invention is not limited to extracting liquid but can also be used for removing powders or grains.

DATED fifteenth day of August 2003

ANGUS REARDON

by his Patent Attorneys

FISHER ADAMS KELLY

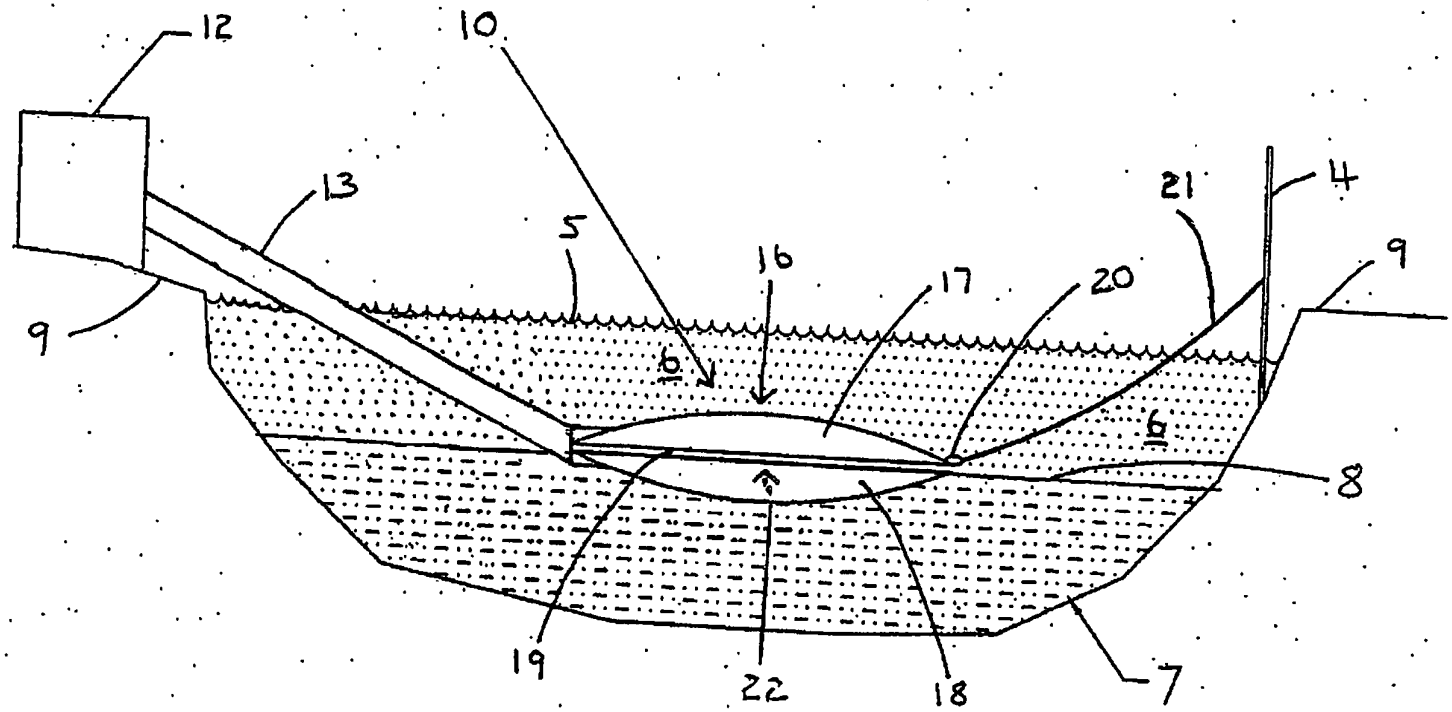

FIG. 1

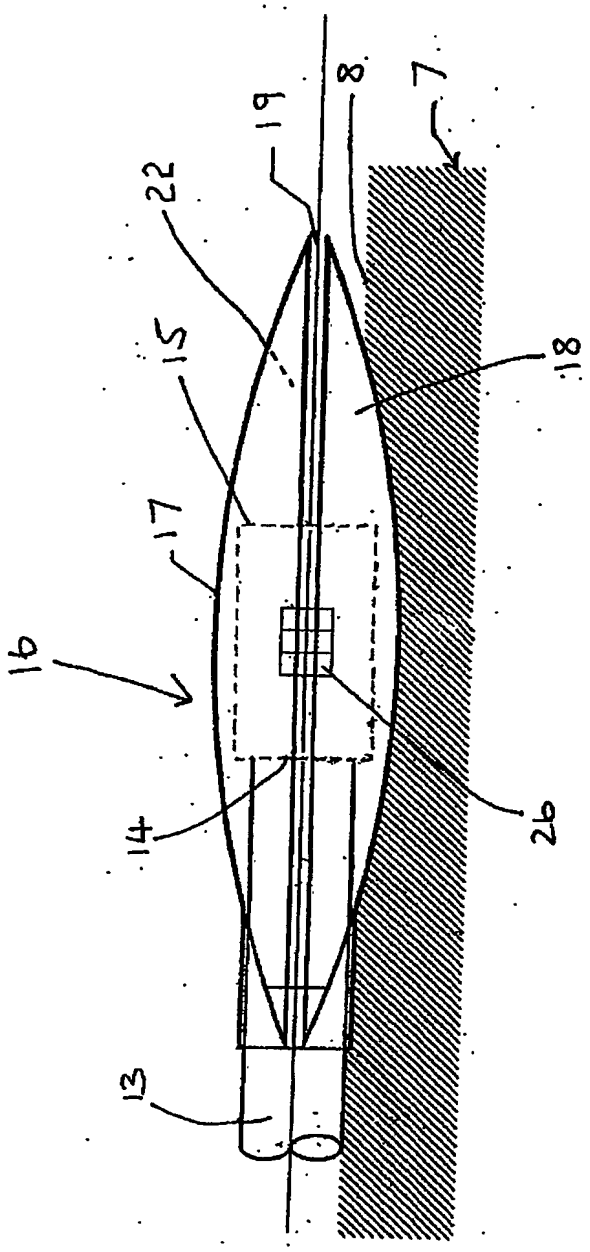

FIG. 2

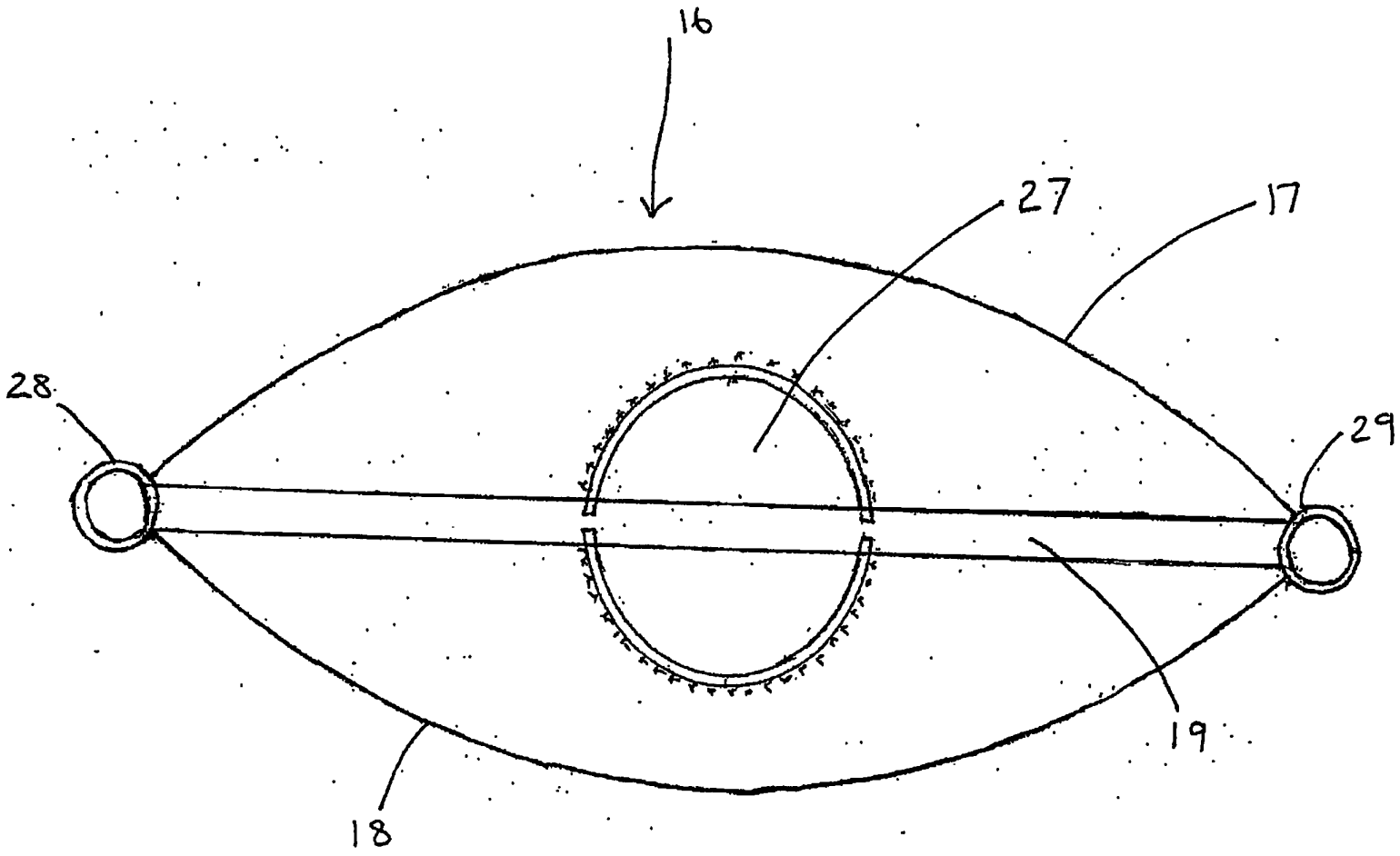

FIG-3

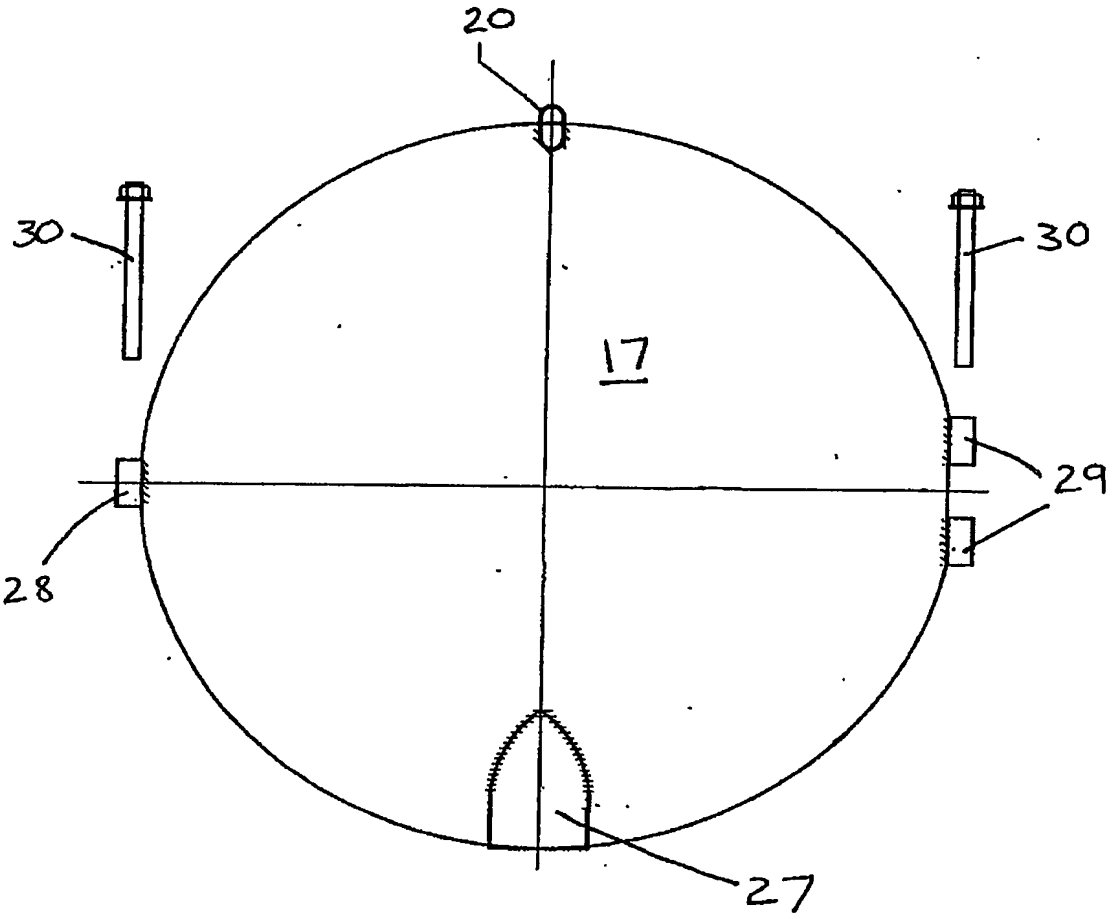

FIG. 4